DOCUMENT RESUME

ED 459 700 IR 021 059

AUTHOR Latimer, Christopher P.
TITLE Government Information Focus. The Digital Divide: Understanding and Addressing the Challenge.
INSTITUTION New York State Forum for Information Resource Management.
PUB DATE 2001-12-00
NOTE 37p.
AVAILABLE FROM New York State Forum for Information Resource Management, Rockefeller Institute of Government, 411 State St., Albany, NY 12203-1003. Tel: 518-443-5001; Fax: 518-443-5006; Web site: http://www.nysfirm.org.
PUB TYPE Reports - Descriptive (141)
EDRS PRICE EDRS Price MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Access to Computers; Access to Information; *Information Technology; *Internet; *Technological Literacy; Telecommunications; Users (Information)
IDENTIFIERS *Access to Technology; *Digital Divide

ABSTRACT

This report discusses the challenges of the Digital Divide. Part I examines the issues concerning access as it relates to schools, communities, free Internet service providers, and broadband. Part II defines technological literacy and how it pertains to the Digital Divide debate. Part III examines those who are affected by the divide and determines whether solutions that address access and technological literacy may remedy the problem. This section also briefly examines the current statistics concerning those impacted by the Digital Divide and compares the findings through a small sample. Topics covered include private industry and government, banking, tax, social issues, disability, senior citizens, gender, race, and class. Part IV concludes with a series of broad based questions that encompass the range of issues discussed in the report and serve as a platform for developing productive strategies designed to address the Digital Divide. (MES)

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Government Information Focus

The Digital Divide: Understanding and Addressing the Challenge

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IR021059

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December 2001

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The New York State Forum for Information Resource Management (NYSFIRM) is a network of public officials and state and local government organizations concerned with information management policy and technology.

Information is a vital resource for New York State. Agencies of state and local governments have widely adopted information technologies to improve their abilities to meet their responsibilities. These technologies, the information they process, and the people who use and manage them are essential components of modern e-government. Together they support a wide variety of public services, contribute to economic health and development, help to manage the state's physical infrastructure and the natural environment, foster educational and cultural development, and enable virtual service delivery. Public managers in New York State have become increasingly aware of a need to articulate information policies and to improve the management of information resources which support state and local operations. A mechanism is clearly needed to support an ongoing exchange of professional and managerial experiences, to coordinate efforts involving issues that are common or transcend the ability of a single organization, and to facilitate useful sharing of the State's technological, human and information resources.

It is the mission of the New York State Forum for Information Resource Management to promote policies, practices and knowledge transfer for effective use and management of information resources in New York State Government.

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Foreword

As technologies and telecommunications continue to converge, the Internet promises to provide an exciting array of opportunities to access learning and health services, conduct research, secure needed commercial goods and services, qualify for and receive government benefits and maintain instant worldwide communications for personal, business and government purposes. Over the last several years considerable attention has been drawn to the significant disparity across groups in our society related to having access to the Internet, and ultimately, the opportunities and advantages it holds. Typically referred to as the "Digital Divide," the metric for its measurement is often limited to but the single dimension of "access." In considering approaches that might ultimately lead to resolving the deleterious effects of the Digital Divide, it was felt that as an initial step it would be of value to better articulate the parameters of the disparity and examine other dimensions that characterize the "Divide" and its impact. Moreover, it was felt that by undertaking a work of this nature, we might create a fuller and more informed level of understanding upon which we might launch exploration and ultimately build effective, long-term solutions. As but two examples of how far the problem departs from simply access, the author points out: (1) how the Digital Divide may result in a growing shift of the sales tax burden to those who can least afford to pay it and (2) how crucial it is to develop some base level of competency in the use of the Internet if its benefits are to be fully realized.

Christopher P. Latimer, Esq. has authored previous, important works for New York State Forum for Information Resource Management. In this instance, his work represents a profound first step in an action plan intended to achieve the creation of enlightened policies, regulation and laws that directly address and close the digital divide. This work serves as the basis for the launch of a deliberate dialog and planned events to further refine the implications of the digital divide, to develop collaborative public/private initiatives, to identify and replicate best practices in New York State and beyond, and to engage policy and legislative leadership to accept the challenge of fully understanding and addressing this growing inequity.

Gregory M. Benson, Jr.
Executive Director
New York State Forum
for Information Resource Management

Introduction

"The underpinnings of the current regulatory regime for media are dated. Much of the regulatory structure and analytical foundations that exist today were built around television and radio as it existed in the 'golden age.' The current rules, standards and principles do not take account of very dramatic changes in the media landscape."

Michael K. Powell
Chairman
Federal Communications
Press Conference
October 23, 2001

The Internet, along with other information technologies, poses significant challenges for government policymakers and the private sector. Difficult legal, economic, social and policy issues arise because Internet-based services and access to terminal locations do not fit easily into the longstanding classifications provided under federal or state law or Federal Communications Commission (hereinafter FCC) regulations. The Internet is arguably the most far-reaching technological innovation of the twentieth century. Its rapid growth has had the residual affect of creating a "technological divide" between segments of the population. At present, approximately 116.5 million Americans are online at some location using the "information superhighway" for a variety of reasons, including commerce, business transactions, health consultation, entertainment, education, and personal communication.[1] Congress has on several occasions attempted to pass legislation that would take into consideration the growth of "technological innovation" with the hope of equalizing access and participation by all Americans.

The Communication Act of 1934, Title I, Section 1, set forth the goal of American communications policy "to make available, so far as possible, to all people of the United States a rapid, efficient, nationwide, and worldwide wire and radio communications service with adequate facilities at reasonable charges."[2] The Act also established the FCC and over time has been amended to deal with the rapid advancement in technology and telecommunications. Congress' primary goal is to ensure that all Americans have affordable, nondiscriminatory access to communications services. To accomplish this goal, Congress instituted a number of regulatory changes via the Telecommunications Act of 1996, which states in relevant part: " . . . to make available so far as possible to all people of the United States without discrimination on the basis of race, color, religion, national origin, or sex, a rapid, efficient, nationwide and worldwide wire and radio-communications service with adequate facilities at reasonable charges."[3] This idyllic situation has yet to be realized in the United States. As a result, a number of scholars have conducted research during the past twenty years to determine who is being left behind in this technological expansion and why.

The discrepancy between technology "haves" and "have-nots" has become a cause for concern in the United States. Known as the "Digital Divide," this discrepancy refers, in general, to the gap between those who have access to technology and the means or expertise to utilize the technologies for such purposes as connecting to and surfing the Internet versus those who do not. This divide includes issues associated with convergence of technologies, industries, and content; operation of technologies and resources; accessibility of and access to information and resources; and levels of literacy, skill and proficiency in the use of information and technologies. It appears that, even as record numbers of Americans go online, the gap between the haves and have-nots may be growing. The Digital Divide is also arguably an indicator of deeper divides within society. This condition appears to be cyclical in nature. Social gaps in society cause the Digital Divide, but the Digital Divide in turn may intensify the existing social gaps and create new ones. As a result, the Digital Divide can be seen as both a symptom and a cause of underlying disparities in society.

To what degree there is a gap and whom it involves is not entirely clear. Therefore, before this gap can be addressed, the questions of who is affected and why they are affected must be better understood. There are a number of divergent views regarding the Digital Divide. Some scholars contend that computers and training will solve the problem. But who should absorb the tremendous cost? Should it be the government, nonprofit organizations, the public or private sector? Others contend that a lack of government action hinders the development and use of computer technology, and until regulations are altered and clarified, the Digital Divide cannot be systematically explained. In recent years there has been an inclination to focus on the inability of individuals to effectively use computer technology due to a lack of understanding or because they believe that it is irrelevant to their lives. Social issues such as basic literacy, poverty, and the growth of e-commerce also come into view — and the question is asked whether technology will help us develop a solution to these serious problems.

The failure to uniformly understand the divide is due in part to the fact that the term Digital Divide is inadequately defined and often misrepresented. It is important to be clear when explaining "access" and the proficiency that is necessary when utilizing technology. During the past twenty years, the general discussion

concerning the Digital Divide has leaned toward the comparison of the population of Internet users versus the general population of nonusers. In order to understand this phenomenon we must determine the extent to which people have "access" to computer terminals as well as to the Internet. Even though access is still important as demonstrated by the "broadband" debate below, scholars have come to realize over the past few years that access in and of itself does not wholly explain the divide. In response, a number of scholars and private organizations have begun to examine the abilities of individuals to utilize advanced technologies. We will term this "technological literacy."

The Digital Divide is extremely complex, and encompasses not only information and technology issues but also social, cultural, political and economic issues as well. In the public dialogue, characterizations of the divide are developing but vary depending on the forum. When the Internet was being developed and its infrastructure was being laid out, the network was flourishing primarily at universities and major defense research facilities. In the early 1980s and 1990s, networks and service providers began to connect cities that housed corporations with a need for high information volume. The Digital Divide also concerns itself with development. It is systemic, complex, and multifaceted, and is characterized by its impacts.

There is ambiguity in the present debate regarding the Digital Divide and what technology actually encompasses. Is technology just computers and the Internet? Is it multimedia and digital graphics? Is it the consequence of rewiring educational centers to make them Internet accessible? In general, technology is the means by which individuals modify, conceive, innovate, alter, and revise their natural surroundings to suit their own principles. Access also implies that once a user has the computer terminal and a connection to the Internet and is able to use it, he or she can find content and applications that have meaning for educational needs. Increasingly, Americans are using the Internet to find jobs, contact colleagues, locate public information, or take courses online. In the population at large and in the media, science and technology are still mistaken for each other. Many scholars often consider technological literacy to be the ability to use computers—far too narrow a view. The fundamental difference between science and technology is ignored or not appreciated. While new information

and communication technologies have permeated our social, economic, and personal lives, their establishment in literacy education has been much slower.

The federal government, community groups and other private industries have cautioned that there is another emerging aspect of the divide occurring as Internet speed and other technological advances come to fruition. Each time a new technology emerges, a new divide is created between those who have access and those who do not. It becomes a never-ending cycle that will be difficult for policymakers to overcome. Federal agencies, such as the National Telecommunications and Information Administration, and private organizations, such as the Benton Foundation, have warned that a failure to guarantee extensive access to these new technologies will lead to an extremely stratified society separated by information haves and information have-nots.[4] Even though the United States has realized improvement in increasing access to the Internet, the digital world will continue to be divided as new technologies such as broadband are developed and remain out of reach for some segments of our society.

The Digital Divide manifests itself in communities, institutions, governments, businesses, medicine, health care, education and the workforce. Part I will examine the issues concerning access as it relates to schools, communities, free Internet service providers and broadband. Part II will define technological literacy and how it pertains to the Digital Divide debate. Part III will examine those who are affected by the divide and determine whether solutions that address access and technological literacy may remedy the problem. This section will also briefly examine the current statistics concerning those impacted by the Digital Divide and compare the findings through a small sample. Part IV concludes with a series of broad based questions that encompass the range of issues discussed in this whitepaper and will serve as a platform for developing productive strategies designed to address the Digital Divide.

Part I: Access

Access to computers and the ability to connect to the Internet are two significant components of the Digital Divide debate. In August, 2000, the US Department of Commerce conducted a study and found that 51% of US households have computers while 41.5% have Internet access.[5] Individuals and communities that do not have access to essential and sophisticated telecommunication services will lag behind. Yet, as the Internet expands exponentially, some scholars are starting to scrutinize the policy repercussions of current demographic patterns of Internet access. Demographic variables such as income, education, gender, geographical location and race will most likely have a differential impact on the costs of interactive electronic media. The Internet has become an invaluable tool for personal success and professional advancement. Access must be convenient and affordable. It must offer users the opportunity to find and download complex, content-rich resources in simple and accessible ways.

Even though access has dominated the Digital Divide debate, it is very complex and new issues continue to present themselves. As new technologies such as access to broadband develop, policymakers should be aware of the potential costs and benefits in order to evaluate their potential for widespread use. It is important to recognize that the access may take place in the school or college or adult literacy classroom, in the library or after school center, in the community center or workplace, as well as in the home. An examination of several environments of access might better define the problems associated with the Digital Divide.

Schools

Local governments across the United States have begun to rely on schools as an access point for its young people. This reliance is based in part on the fact that connectivity is critical if individuals are to be empowered by digital technology. For example, the E-Rate was established by a bipartisan act of Congress in the Telecommunications Act of 1996 through the Snowe-Rockefeller-Exon-Kerrey Amendment. The program provides discounts of 20-90% on telecommunications services, Internet access and internal connections for schools and libraries. Eligible services range from basic local and long-distance phone services and Internet access services, to the acquisition and installation of equipment to provide network wiring within school and library buildings. Computer hardware and software, staff training and electrical upgrades are not covered.

The E-Rate helps bridge the Digital Divide by providing greater discounts for poor and/or rural schools. In 1999, 54% of the dollars allocated by the E-Rate program were provided to economically disadvantaged students and library patrons.[6] All public elementary and secondary schools as well as most K-12 private and parochial schools, are eligible for discounts

under the E-Rate program. In addition, libraries that are independent of institutions of higher education are also eligible. Colleges, universities, and their affiliated libraries are not eligible to participate in the program nor are day care centers or after-school programs held off campus. The E-Rate thus helps insure that all children including those who do not have computers or Internet access at home will have the high-tech tools necessary for the new digital economy.

Funding for E-Rate program discounts comes from the telecommunications industry, in an Information Age update to the time-honored concept of universal service. The level of discounts schools and libraries are eligible to receive depends on economic need and location, whether rural or urban. Once approved, they apply their discounts to telecommunications services, Internet access and internal connections, then pay the difference out of their own budgets. There are indications that this cutting edge technology can improve learning, particularly for the most disadvantaged children. This technology may compel school administrators to choose between investing in technology or investing in other things that will improve learning, such as specialized workforce expansion, smaller classes, and better curriculum. By helping to build the essential infrastructure E-Rate can ensure that all educational facilities will have access to the latest technology.

The E-Rate and its state counterparts have subsidized thousands of schools and libraries with billions of dollars in order to connect these institutions to the Internet. A number of schools and libraries that have access to this program have failed to use these opportunities to their full potential. This is in part because the schools are seen purely as "content providers" rather than "tool providers." This perception has left potential users in a quandary because they do not want to feel ill prepared and embarrassed. It can also be problematic that the administrators are from older generations and may fail to fully comprehend the full potential of the technologies available.

Next, how do we bring teachers "into the fold?" Teachers must learn to use the programs which are necessary to create online learning sites for academic discussions, and they must feel comfortable teaching their programs to the students. Second, teachers must also be taught how to integrate technology into the existing curriculum. There is not enough time in the educational day to add a technology lesson. Once the computers in a school are online, students will have a chance to use them, even if the school system installs inadequate software. It might be productive to perform a school-by-school survey of computer and Internet usage linked to student academic success. This might help policymakers to better understand that if a school does not utilize its computers and software many students will not be prepared for higher education or the job market. The integration of technology into the curriculum is a difficult concept to implement. A recent study conducted by the National Center for Education Statistics found that by

the fall of 2000, almost every public school in the United States had access to the Internet: 98% were connected.[7] In comparison, 35% of public schools had access to the Internet in 1994.[8] To effectively serve technologically savvy students in a modern society, educators at all levels and in all classes across the country must provide students with exposure to the bare minimum of technology. These are concerns that need to be addressed by policymakers who are attempting to bridge the divide.

Community Access

In order to respond to the large number of inner city and economically depressed areas where individuals have little resources to buy a computer or Internet access, local communities and governments have begun to set up computer community centers which may be used by people living in the surrounding area. For example, Community Technology Centers' Network (CTCNet) is a national, non-profit membership organization of more than 500 independent community technology centers where people receive free or low-cost access to computers and computer-related technology. CTCNet brings together agencies and programs that provide opportunities for people of every walk of life to use these technologies. This experience allows individuals to develop personal skills and self-confidence.

"The key to the success of our programs is the systematic approach we have taken. We work hand in hand with agencies such as DSS, Albany Housing Authority and New York State Department of Labor. Our goal is to create healthy communities using technology as the tool."

Sandy Paben
Director
Community Technology Initiative

Community-based organizations can also help provide access to computers and the Internet where communities need it most. Each community knows best how to reach residents, whether through traditional community centers, churches, senior centers, fire and police stations, or other types of centers. For example, Community Technology Initiative, in conjunction with local government offices and housing agencies, has created and implemented Community Technology Centers.[9] At each of these Centers, people can take advantage of the vast amount of resources that are available. After school programs and workshops have been set into place in order to give elementary and middle school students within the community an opportunity to utilize technology in a fun and educational manner in a safe environment.

As part of the ongoing initiative Governor Pataki announced in July of 2001 that Hastings Niagara Inc. had been awarded a $71,500 matching grant under the State's "Wired Building" initiative as part of a $1.1 million renovation of the former Jenss Department Store building on Main St. in Niagara Falls.[10] The funding will be used for the installation of wiring to convert the 100-year-old, 40,000-square-foot building into a "smart" building capable of supporting the high-tech telecommunications needs of up to five tenants. The Wired Building initiative, administered by Empire State Development (ESD), New York State's economic development agency, helps developers outfit existing buildings to accommodate the needs of small Information Technology (IT) companies. The program will increase the availability of affordable, "wired" workspace required by small IT businesses,

"There needs to be direct community-based involvement in the development of these initiatives to ensure that their concerns are identified and implemented. The ultimate goal of these initiatives is to provide access to information in the homes of people in the community. Technology centers are a stage along that path."

Dr. Joseph Bowman, Jr.
Regent

such as those developing e-commerce applications, offering online services, or engaging in software research and development.

There are practical considerations that need to be addressed by localities and state government. A number of these "parent" projects have been developed but are under utilized for a number of reasons. Usually, residents are unaware of such facilities due to inadequate advertising. For those who are aware of these computing centers, sometimes they are intimidated by the technology and are therefore not comfortable in asking for assistance. Another concern has been the issue of safety when traveling to the facility. In this case, residents are sometimes afraid to let their children walk alone to the centers and they themselves might be intimidated. These issues need to be addressed by policymakers if money is going to be spent on building community computer centers to be used by local residents.

Free Internet Service Providers

The number of US households with Internet access dropped .3% in the first quarter of 2001 according to Telecommunications Reports International. Even though a very small percentage, one of the main reasons for the drop was the demise of several free Internet Service Providers (hereinafter ISP). Last year, free ISPs were expanding and attempting to attract business from consumers who connect using pay services such as America Online and CompuServe. Late in 2000, a number of free services such as 1stUp.net and FreeLane went bankrupt. Other services such as Juno, a company that utilizes advertising windows to support free Internet access, have changed their initial unlimited format to a more restricted model. Free Internet users not only have to endure ads but now they must confine their usage to certain "off peak" times of the day. Juno has also started to offer a pay service which guarantees unlimited Internet access for its customers. These changes represent a trend in the market away from unlimited free access to a more restricted format for users. In order to stay competitive, Juno has recently merged with NetZero, another free ISP. This may further hinder those segments of our society who are not able to afford a monthly fee of 15 to 30 dollars a month and widen the gap between the haves and have-nots.

Broadband

Another area of debate concerning access which has become more prevalent in the last five years has been the proliferation of broadband. In August 2000, only 10.7% of households with Internet access had broadband.[11] Among those households that have broadband, the overwhelming majority use cable modems at 50.8% and Digital Subscriber Line (hereinafter DSL) at 33.7%.[12] There is, however, a great deal of confusion concerning broadband. The confusion stems from two sources including a failure to adequately define what technologies constitute

broadband, and once defined determining how this issue impacts the Digital Divide. In order to get a better understanding of broadband, there will be a brief description of what makes up broadband and how it is different from conventional dialup access. This might be confusing at times, but it helps to demonstrate that access is an ever-evolving issue that should be continually examined and updated for policymakers to remain informed in the future.

Broadband is a form of digital data transmission that uses a wide range of frequencies to achieve additional bandwidth. By definition, broadband designates a transmission speed of at least 2 Mbit/s or two million bits per second. Broadband is thus not a system or a technology, but rather refers to speed or capacity. For low speeds, the term is narrowband, while higher speeds, from several hundred Kbit/s up to 2 Mbit/s, is called wideband. Although not technically meeting the 2 Mbps broadband threshold, many ISPs classify this "wider" bandwidth service offering as "broadband" in the retail market. The picture gets even murkier as more and more communications companies claim they are in the broadband arena, including cable operators, long distance suppliers, television broadcasters, local exchange carriers, and satellite companies.

The technological advances in broadband Internet access depend in part on fiber-optic cable. Digital and fiber-optic technologies are key elements in powering the broadband concept. There are a number of different types of services which fall under the heading of broadband. The three most typical forms of broadband that have recently become available to homes and small businesses are DSL, wireless or satellite and cable. DSL, cable modem, wireless and satellite connections to the Internet are at least ten times faster than a dialup connection made through a 56-Kilobytes-per-second or 28.8-Kbps link. One major advantage of broadband is that a cable modem or DSL link to the Internet is always on; there's no need to dial in to an ISP. Broadband channels a bigger pipeline through which the immense information on the Internet (movies, music, teleconferences and instant messaging) can move at speeds from 100 to 1,000 times more rapidly than the more traditional narrowband.

The downside is that the cable and wireless forms of broadband share their bandwidth with neighboring users. As more users log on to a particular service, the bandwidth availability on that line is diminished. DSL transforms copper telephone lines into powerful carriers of digital data. DSL uses the same copper wires that carry voice traffic to your telephone that carry high-speed data. Your PC's connection to the DSL network is usually done through a "router," which is placed next to your computer. Cable modems utilize the same cable television company lines that deliver TV pictures and sound to your television set. Modems are also generally placed next to your computer. The most common way to receive broadband is through a cable subscription. While prices vary from region to region, one can expect to pay almost double what is paid for conventional dialup access.

Wireless, which is typically made up of on-the-ground, antenna-to-antenna systems is commonly called "fixed-wireless" systems. Satellite is provided by direct broadcast satellite (DBS) companies like DirectTV and EchoStar, as well as new companies focusing only on Internet connections. Satellite companies, such as Hughes Network Systems, the operators of DirectTV, have also developed wireless upload capacity to match the tremendous download capacity that satellites offer. While neither medium can quite yet effectively deliver reliable interactivity, cable and satellite are making strides in overcoming that obstacle.

Broadband technologies offer consumers faster access and better connections to the Internet, enabling the fast and easy use of computer networks for audio and video delivery. However, broadband-access penetration has been sluggish for several reasons. The scope of DSL is currently limited both by the number of telephone switches that have been updated to accommodate the technology and by the requirement that customers live within approximately three and one-half miles of an updated telephone switching station. Cable modems do not suffer from a similar geographic restriction, but they do require certain updates to the existing cable television network. Cable and telephone companies have been slow to upgrade their networks with fiber-optic and other expensive technologies. The cost of laying down miles upon miles of this type of cable is substantial. This cost will be partially absorbed by the companies, but a large proportion will be passed on to the consumer through monthly fees. This means that many people would not be able to afford the additional forty to fifty dollars per month for high-speed access.

Independent DSL enterprises have had trouble winning access to the telephone companies' lines so that they can deploy high-speed Internet-access service. Wireless companies must deal with an array of technological and marketing issues before they can attain a large subscribership. Again, access and actual connection to these new technologies are two very different creatures that depend on a variety of factors such as location and cost.[13] Cable and DSL use the two data pipes currently connected to most homes: the phone line and the cable television line. Cable operators are expected to spend $33 billion by 2001, to develop broadband technologies.[14]

These broadband networks are typically separated into national or global infrastructures, which provide long-distance communications for great quantities of electronic information and local supports that provide local transmission and access. For cable modem service, expect to pay up to $150 for installation, and from $29.95 to $50 a month for service. DSL installation costs are approximately the same. The monthly charge for service varies depending on the speed of your line. But one can expect to pay between $19.95 a month and $100 a month depending on the carrier. Wireless and satellite-delivered service can cost $100 and up a month. There is also a substantial installation fee. Several cable outlets provide "packages" which combine digital television cable services with broadband Internet

connections, but this small reduction will not offset the increase for the typical household.

At present, more than 24 million workers are able to access the Internet by using broadband connections at work. It is estimated that by the year 2005 that number will skyrocket to 55 million which represents almost 90% of workers who have access at work.[15] This is not the case for those individuals who have access at home. Currently, fewer than 9 million people or 9% of those who have Internet access at home have high speed or broadband capabilities.[16] By 2005 there are estimates that 59 million or 36% of home surfers will have broadband capabilities.[17] More than 30% of all broadband users in the United States live in the top five metropolitan areas, according to data from Nielsen-NetRatings.[18] New York dominates the high-speed access market with more than 10% of US broadband population living in the city or the surrounding metropolitan area. Nearly 6% of the country's high-speed Internet users reside in Los Angeles, while the San Francisco area is home to 5.7%.[19] "In the past, high-speed providers focused the rollout of their services to the top local market regions, like New York," said T.S. Kelly, Director of Internet Media Strategies at NetRatings.[20] "New York's building unit density has allowed for higher broadband usage growth, compared to the rest of the top local markets. The city's apartment dwellings provide a much bigger consumer target than regions that have predominantly single-family units."[21]

The idea of cost also extends to the monopolistic nature of broadband activity. If cable companies are allowed to set prices with little government regulation, prices may continue to be out of reach for the typical consumer. A prospect of entrenched market power defending its advantage is one that consumers know all too well from the telecommunications and software industries as evidenced by the AT&T monopoly and the Microsoft case. Even if regulators should attempt to force AT&T to provide open access, it might take years to overcome the legal and political barriers. A debate has begun regarding whether the government should intervene so that we may have "open access" in the market place. Many policymakers agree that more could be done through cooperation with service providers than could be through regulation.

Geographical region must be considered when we discuss broadband and the Digital Divide. A number of start-up businesses that are driving employment and capital in the new economy are built around the Internet and will only locate where it can be readily accessed. Even established businesses require high-speed Net connections to communicate effectively with customers, suppliers and employees. Many workers consider the bandwidth availability when they decide where to work, live or buy vacation homes. Federal, state and local government needs such as education and welfare services usually comprise a larger proportion of telecommunications demand in rural areas than they do in urban areas. The biggest barrier many rural communities face in their attempts to get the advanced

telecommunications services necessary for economic growth is the inability of state and federal government agencies to collaborate. This is not a problem in urban localities where there is ample business and suburban demand to defend network investment.

The National Telecommunication and Information Administration released a report that concludes that approximately 38.9% of rural areas are online.[22] In fact, approximately 86% of the Internet delivery capacity in the US is concentrated in the 20 largest cities.[23] Rural areas in the South lag the most, rural areas in the West the least. Although 52% of US Internet users have access to some sort of broadband Internet service, 17% of those only had access to cable modem service while 10% reported that DSL was the only service available.[24] Asked why they still used dialup technology to get online, 29% of Internet users surveyed by the GAO said they had no broadband alternative while approximately 40% of users said that dialup connections are the "least expensive" option.[25]

Rural residents are capable of creative local initiatives to get some of their local needs met, but they most need help in getting more capacity on the links from their rural communities to major urban centers. They are also forced to rely on policymakers and their abilities to persuade businesses to invest in their areas. Telecommunications providers however might be more responsive to a large order for service from a large business or government agency than they are to the greater combined demand of a large number of smaller users. For example, Michael Vandow, a professor at SUNY Cobleskill, was able to bring cable access to wire outlying rural areas around the University. Uniting 17 municipalities in the region, or approximately 6,000 subscribers, Professor Vandow secured a contract including a $65,000 grant for equipment and support for SCHOPEG, Inc. a not-for-profit cable company. Until others are able to secure such grants, there will be greater access for those urban users than there will be for more rural areas which will lead to great fragmentation and weakened business opportunities for everyone.

Access is the most studied characteristic of the Digital Divide debate. Although new technologies are providing faster and better capabilities, the notion of access should not be disregarded. As we have seen, the issue of access is still relevant as new technologies are developed and the gap between haves and have nots continues to grow in these specialized arenas. Whether we are talking about free ISPs, community centers, schools or issues such as broadband, access continues to be a divisive issue for policymakers that needs to be continually examined to ensure the gap does not start to expand.

Part II: Technological Literacy

"Perhaps more important than the Digital Divide is the reality that millions of Americans are illiterate. Before solving the problem of technological literacy, people must learn to read.

Robert Freeman
Executive Director
Committee on Open Government
NYS Department of State

Computers and the Internet are important educational tools. But equating the use of computers with technological literacy is far too limited a view, given the extent to which technology has transformed our lives. Technological literacy, similar to general literacy, is more than just being able to read and write. The principle underlying technological literacy can be better understood through two categories: the socio-economic context and the technical context. The socio-economic context is based upon a social, economic, and political need to supply and foster literacy for technological decision-making in a democratic society. The technical perspective is based upon the requirement for proficiency in operating technology in education, business, and industry. Both are valuable but vary considerably in purpose.

The broad-based programs that are primarily delivered by non-technologists best represent the socio-economic context. The engineering, vocational, and technology education programs delivered by engineers and technologists best represent the technical perspective. Technological literacy involves an array of abilities including crucial functional skills and critical thinking, constructive work habits, a set of generalized procedures for working with technology, actual technological capability, key interpersonal and collaboration skills, and the ability to be taught autonomously. These programs are only effective for those individuals who are literate. If you are unable to read, you are going to have a difficult time using the Internet—and according to a National Adult Literacy Survey completed in the last decade, 44 million adults in this country are functionally illiterate. [26]

Another important aspect of the technological literacy debate is the increasing numbers of non-English speaking individuals who access the Internet. Worldwide, every day, 56 million people who access the Internet are not English speaking. The Spanish speaking community comprises 25% of non-English speaking people on the Internet, with the Asian community following closely behind at 22%.[27] A number of corporations and smaller businesses are beginning to realize that there is an untapped market of consumers who are surfing the Internet but are not able to understand the English language. A number of companies have begun to contract with a document translation service to assist them in this venture. This makes it more difficult for those people who might be willing to utilize community centers or government sponsored classes that are primarily in English. Even if they were able to access the Internet and understand its applications, most sites are geared toward the English speaking community.

When it comes to the Digital Divide, technological literacy is a concern that until very recently has often been overshadowed by access. The problem of a divide is not limited to access. The debate has shifted to another important aspect associated with the Digital Divide. Technological literacy is the ability of an individual to use, manage, assess, and understand

technology. A person who is technologically literate understands, in increasingly sophisticated ways that evolve over time, what technology is, how it is created, and how it is shaped by society. A technologically literate person will be comfortable with and objective about technology and neither intimidated nor infatuated by it. Technological literacy refers to everything from basic reading proficiency to computer-generated fluency. An individual must be able to make use of all the tools available, as well as interpret and understand all the content one might discover and locate.

It is also important to focus on and understand the developing technological infrastructure and the level of access for a particular community. Unless there is a broad-based consideration of the divide from multiple perspectives, the issue will be understood in a limited way. The rapid emergence in many of our classrooms of networked information and communication technology (ICT), such as the Internet, requires us to fundamentally redefine our understanding of literacy in the United States. In fact, a growing number of scholars, policymakers and educators have called for the study of technology to be included as a core subject in elementary, middle and secondary schools. The ultimate goal of a school program that involves the study of technology is to teach and strengthen technological literacy to all students.

Familiarity with new technologies will also prepare more Americans for the high-tech workplace of the 21st century. The concept of Digital Divide also reflects and refers to change in the world economy that is rapidly becoming an information-based or digital economy. That is, the economic well-being and success of all economies — local, state, federal, and international are increasingly tied to the growth of the digital economy. Consequently, the economic and social well-being of societies, communities and people are dependent on successful participation in the new technology. However, some policymakers and other Digital Divide scholars are framing the issues and considering possible solutions regarding technologies, access, content and other areas — and are failing to consider the whole picture.

Many policymakers, corporations and organizations are still focusing exclusively on computer access issues and are failing to address other access, technology and information literacy issues. As the economy becomes progressively more international and technologically complex, it is critical that education be strengthened to prepare today's students to be tomorrow's productive workers and citizens. In addition to creating a technologically literate citizenry, there is an urgent need to develop a technologically capable workforce that can compete in the global market place. Employers are increasingly concerned about the lack of technically skilled workers. The lack of knowledge and understanding in this area coupled with the speed at which these issues are moving, places the information science community in the position of needing to move strategically and expeditiously to provide the expertise.

There is a whole spectrum of literacy skills that should be developed and cultivated in order to connect and utilize the full potential of the Internet. At one end of the spectrum, there are the literacy concerns that most scholars are all familiar with, including basic and functional literacy. Beyond that, one must also consider technological literacy. For example, even if the average person knows how to turn on a computer: would he or she have the technological literacy skills needed to use it effectively? Libraries are moving quickly to transform themselves into high-tech learning centers to help combat these problems. More than 95% of public libraries now provide Internet access, along with instructional computer training, which can help provide their users with the skills and knowledge they need to effectively use the Internet in a safe and responsible manner.[21]

"Imagine a vast uncataloged library where very few substantive materials are free, there are no quality controls, and most research materials more than 15 years old aren't available. That's the Internet. We need to keep in mind that the Internet is marvelous, but it's simply one more information tool. Libraries and librarians are needed now more than ever to do what they've always done — assure equitable access to the quality information materials that people need for work, school, business and leisure."

Valerie Chevrette
Coordinator
Communications
NYS Library

School library media centers, academic libraries, and especially public libraries—together maintaining more than 100,000 facilities—provide a broad spectrum of programs and services, trained, skilled staff, materials and other resources, as well as access to information technologies and services. These libraries also partner and collaborate with almost every type of organization and agency to maximize equitable access to information and information technologies. The challenge to libraries regarding the Digital Divide is to justify and clarify the role of libraries in the information age. Library programs, services and staff expertise focus on not only providing access to information and technology, but also on assisting clients to acquire the abilities, skills and knowledge needed to successfully use information and technology. There are serious dangers in the lack of technological literacy. Individuals will remain disenfranchised unless they learn to successfully access and integrate information. Society as a whole will be unable to function globally without at least a limited understanding of the nature of technology, of the opportunities and risks that technology presents to us, and of how to intelligently guide and use technological innovations.

It appears that in order to combat the lack of technological literacy in the US, there needs to be a three-pronged approach. Beyond continuing to provide access through computers etc., several cities have realized the potential of providing not only community technological learning centers but also developing advanced technological curricula for high schools. This, along with a concerted effort by government, nonprofits and private business, are the necessary ingredients needed for a strong response to this important aspect of the debate. Sometimes unique communities require a project or initiative best suited for their situation. Local governments might work with cable companies and ISPs to supply the local high school or library with computer technology programs. There is no one simple solution, and as a society we need to continue to develop partnerships across the public and private sectors and all levels of government to improve literacy in relation to the Digital Divide.

Part III: Impact of the Digital Divide

The United States is in the midst of an economic and social revolution as far-reaching as any in the past. Computers and information technologies are transforming nearly every aspect of American life. They are changing the way Americans work and play, increasing productivity, and creating entirely new ways of functioning. Every major US industry has begun to rely heavily on computers and telecommunications. Access to technological advancement, through the computer, the Internet and more recently broadband, will be crucial to the economic success of American businesses, communities and individuals. The Internet has become an invaluable instrument for private and public success and professional progression. Administrative and educational software packages can be used to maintain student records, measure employee and government efficiency, figure payroll, generate state reports and schedule classes. Telephones, voice mail, e-mail, handheld computers, beepers and Internet sites use the power of networking to collect, distribute and update information quickly and proficiently. Experience with new and ever expanding technologies will prepare more Americans for the modern administrative centers of the 21st century. As a result, there needs to be a strong understanding of the relative impact of the Digital Divide to better prepare for future markets.

Private Industry and Government

The federal government's multi-faceted approach to this issue reflects regulatory initiatives to encourage greater competition in the telecommunications market, programs to fund the development of telecommunications infrastructure, community access facilities and training, a range of educational skills development initiatives, and provides government services electronically in ways that enable access for all sectors of the community, such as the disabled and lower income families. One difficulty, however, lies in knowing how to collaborate effectively with other community-based institutions in developing digital information content and services. Government agencies, localities and private industry may be reluctant to collaborate due in part to the different internal methods employed by different levels of government and private corporations. There is also a technology barrier. Private companies may be more likely to be able to invest in cutting edge technologies and are apprehensive about working with agencies utilizing outdated software and equipment.

It is necessary to achieve a stronger understanding of the social context surrounding the exercise of networked information services, particularly in relation to traditionally underserved portions of society. This understanding is a necessary introduction to another significant form of partnership for federal and state governments: working with members of target groups in the co-creation of networked information services at the local level. Federal, State and Local governments as well as private industry

will benefit if the Digital Divide is narrowed. The government should not wait for the private sector to intervene unilaterally, but rather it should develop some sort of unified response to the problem through greater education or tax incentives.

Currently, government programs, such as National Telecommunications and Information Administration Technology Opportunities Program (hereinafter TOP) are being imitated in order to expand access to technological resources in underserved areas. TOP promotes the widespread use of advanced telecommunications and information technologies in the public and nonprofit sectors. The program provides matching demonstration grants to State and Local governments, health care providers, school districts, libraries, social service organizations, public safety services, and other nonprofit entities to help them develop information infrastructures and services that are accessible to all citizens, in rural as well as urban areas. The assistance of private industries is also a necessary component in expanding access to new technologies. Companies are supporting the creation of community technology centers by donating computers and software to schools and neighborhood centers. The private sector's contribution is essential because companies know what kind of skills Americans will need in order to find jobs in the future. The bottom line is that there needs to be a strong and continued partnership between public and private resources to combat the problems of access and technological literacy.

Banking

Technology has cultivated the formation of innovative delivery systems for economic services that have radically augmented expediency and eliminated geographical boundaries. Some examples of this include: automated teller machines (ATMs), bank-by-phone services and online banking. These services allow consumers to perform virtually any banking operation at any moment. For financial institutions, technology has led to the development of intricate databases that offer the capability to gain access to and compare information on their clients' saving and spending blueprints, leading to new goods and production strategies that have permitted banks to respond to consumer wishes and to catalog novel market opportunities. As cyberspace becomes more accessible to the public, online banking becomes more problematic, raising issues such as lack of access to online credit opportunities, discriminatory lending practices and potential security risks.

Technology based banking, or "cyberbanking," has grown dramatically over the past ten years and is becoming a more cost effective and efficient way for customers and banks to conduct business. Robert Sterling, an analyst with Juniper Communications, found that approximately 10% of American consumers bank online and in 1999, 8.3 million people shopped for mortgages and other loans on the Internet, with one of eight

starting the loan application process online.[29] One of the effects of technology is that a bank's community can no longer be defined in geographic terms, and bank branches do not necessarily serve as a focus for the location of a bank's customers anymore. Some banks exist principally in cyberspace. Others serve many of their clientele in that forum. Banks are utilizing technology in greater numbers, increasing the type of services they offer online and enhancing the level of online technological sophistication. In addition to the explosion in the number of banks offering Internet banking, physical banks are combining forces with virtual banks. Despite the promise of lucrative benefits for institutions engaged in cyberbanking, barriers to consumers are ever present, since many Americans lack access to the Internet or the capability to utilize its services.

Tax

Interest is being generated concerning the issue of whether to tax the sale of goods and services offered over the Internet. Internet sales are theoretically taxable in the same manner as catalog sales. If the item is sold in a state where the vendor has a physical presence or "nexus," the vendor collects the appropriate tax and sends the tax to the state. Where this situation does not exist, the consumer is technically supposed to send the "use" tax to the state. In 1992, the United States Supreme Court held that states are not allowed to tax out-of-state purchases unless there is a nexus between the State and the company selling the merchandise.[30] There is a great deal of confusion over this issue for consumers. In response, Congress responded by passing legislation. To this end, consumers enjoy a tax-free Internet by order of the Internet Tax Freedom Act (hereinafter IFTA), signed into law in October, 1998. The tax moratorium was set for three years, and the ITFA also created the Advisory Commission to study the issue of Internet taxes and report back to Congress. Despite the name of the Act, ITFA does not preclude state and local governments from imposing existing sales tax requirements on companies selling over the Internet. In the case of the Internet, a number of multinational companies have created subsidiary online companies and located them in sparsely populated states. That way, the "nexus" which is created will affect the fewest people and require the least amount of purchases having to pay sales tax.

In 2001, the House (H.R. 1410) and Senate (S. 512) introduced the Internet Tax Moratorium and Equity Act. The Act amends the Internet Tax Freedom Act to extend the current moratorium on Internet taxes until December 31, 2005. It further states that Congress should work with states and localities to take part in a joint study to determine the cost of accumulating and remitting State and Local sales and use taxes. However, on October 18, 2001 the Senate failed to pass an eight month extension, delayed by a dispute over how state sales taxes should apply to billions of dollars in e-commerce. The House of Representatives passed a similar two-year extension on October 11, 2001, and the National Conference of State

Legislatures and the National Association of Counties recently endorsed the two-year extension. A number of analysts fear that if Congress fails to act immediately, State and Local governments may attempt to impose some sort of Internet tax to raise revenue. The moratorium expired on Sunday, October 21, 2001.

This is a critical issue because there are approximately 30,000 tax jurisdictions in the United States and 7,500 of them levy sales taxes.[31] Few, if any, of those jurisdictions impose those taxes the same way.[32] Having the Internet subject to normal taxation, however, does not solve the problem of fairly and uniformly collecting such taxes. A report from the General Accounting Office estimated that tax revenue losses for Internet sales ranged from $300 million to $3.8 billion in 2000 and by 2003 there will be between $2.5 billion and $20.4 billion in revenue lost from e-commerce transactions that are not taxed.[33] Doing nothing will likely lead to an array of new state and local taxes and a growing gap in tax collection.

There are practical implications for those who do not have access to the Internet. Those individuals who are not connected and are unable to connect to the Internet cannot capitalize on the tax-free environment and may or perhaps are, beginning to pay an unfair proportion of sales taxes. In other words, these low-income Americans who are least able to afford this duty are left paying a disproportionately high share of sales tax as a result of the Digital Divide. In effect, the burden is shifting once again to those segments of our society without access to the Internet who are least able to pay or absorb additional taxes. Once online, consumers may access online catalogs, which display a limitless range of goods for sale. These goods can be ordered online and delivered by the same conventional means as used when placing an order through a mail order catalog. Other goods, such as computer software, may be transferred electronically, eliminating the need for any form of physical delivery at all, thus saving shipping costs altogether. Consumers may also access online research database information, or obtain professional services such as securities brokerage, legal, and medical consultation. Even simple government services such as renewing car registrations can be performed online. Those individuals and businesses that do not have access or the knowledge to surf the Web are being penalized economically.

Social Impact of the Digital Divide

There have been many studies concerning the social impact of the Digital Divide and who is most affected. The most comprehensive was conducted by the US Department of Commerce. Released in 2000, ***Falling Through the Net: Toward Digital Inclusion***, provides an updated account of the enormity, extent and status of the Digital Divide in America. It is difficult to sift through all of the data to determine which segments of our society are being left behind in this digital age. The confusion may

undermine the ability of policymakers to respond to a problem that is not only inadequately defined, but also points to different causes. It is critical to examine the aggregate statistical data to determine if there are any trends or discrepancies. The Digital Divide can be viewed as a puzzle with numerous pieces, all of which are important. Two of the more important pieces, which are also the most studied, are socioeconomic status and race. Initial indications led many scholars to believe that race was a deciding factor when determining the impact of the Digital Divide. The most recent literature tends to support a number of factors such as race, socioeconomic status and education as elements in the Digital Divide. There are other factors such as geography (described above), disability, age and gender that are also being studied and need to be highlighted to determine why too these groups are being left behind.

Disability

In a recent survey, the Department of Commerce estimated that 45 million or 21.8% of all Americans have a physical or mental disability.[34] Of those surveyed, close to 60% had never used a computer due in part to the variety of problems associated with access.[35] The idea of access becomes more complicated for those with disabilities, for access could mean physical access for someone in a wheelchair versus the availability of hardware, software and trained staff to assist those in need. According to a recent study by the American Foundation for the Blind, there are significant accessibility issues to consider when a consumer determines whether to utilize online services or ISPs.[36] Although America Online is one of the most popular services for accessing the Internet, it is not seen as the best choice for consumers who are blind. Expert screen reader users find it extremely difficult to navigate because of its nonstandard controls (buttons and icons) and lack of keyboard commands. Whether the form is posted for school or event registration, or online banking or shopping transactions, people with visual and/or mobility disabilities are faced with a significant barrier.

The impact is not limited to people with visual and mobility disabilities. People with specific learning disabilities are also finding it difficult to access web pages. Those individuals with cognitive disabilities become lost due to the absence of navigation elements at Internet sites. Moreover, people with hearing disabilities cannot fully understand the content of audio streaming and video clips posted on the Internet due to the absence of captioning. There has been, in recent times, an evolution of disability rights laws that have resulted in a better understanding that access to information and communication is a civil right for people with disabilities. Federal statutes such as the Americans with Disabilities Act of 1990 (ADA) and New York State guidelines such as Technology Policy 99-3 require universal accessibility of websites to persons with disabilities.[37] An interesting area of research would involve determining why those people

with disabilities have not regularly used a computer. It appears, however, that access is still a major part of the problem for those individuals with a disability. Information technology and the Internet have a tremendous potential to broaden the lives and increase the independence of people with disabilities. Even if access were improved, if an ISP or governmental site is not disability friendly, the divide will expand until policymakers pass more comprehensive legislation responding to these concerns.

Senior Citizens

Senior citizens comprise 13% of the US population, but just 4% of the US Internet population.[38] A Harris Poll demonstrated that in 1998, only 8% of those over 65 years of age were online. That percentage increased when they examined those between the ages of 50 and 64, finding that 35% were online.[39] Of the seniors online, most reported that they use the net mainly for news, email, travel and medical information. Since their numbers are relatively small, there has not been much systematic research to determine why seniors are failing to access and use the Internet. Some of the research seems to focus on the issue of technological literacy. A large number of senior citizens are unfamiliar with the Internet and are inexperienced with computer usage. As a result, many are intimidated and reluctant to seek out classes or technologically savvy relatives for fear of being embarrassed and humiliated.

There are a number of ways in which policymakers and the private sector can get involved and will reap the benefits of increased participation of those individuals over 65 years of age. For those older individuals incapacitated due to an illness, pain or lack of mobility, the Internet can be used for healthcare, information on social security benefits, shopping, news and general communication. Healthcare or "telemedicine" is one area in which the elderly could reap a number of benefits including access to prescription drugs at a reduced cost, online consultations, and daily health updates and monitoring. Telemedicine involves the use of electronic communication and information technologies to provide or support medical care at a distance. Other areas would be online grocery shopping and delivery for those individuals caring for a spouse or those without transportation. It is important for policymakers to understand the reluctance of seniors to embrace technology and attempt to respond with appropriate solutions. In this case, setting up computer centers in nursing homes as well as offering classes that are geared towards the elderly and their specific needs.

Gender

The most recent NTIA report, *Falling Through the Net: Toward Digital Inclusion* (August 2000), indicated that women raised their Internet use rates fast enough to close the gap with men. In December, 1998, 34.2%

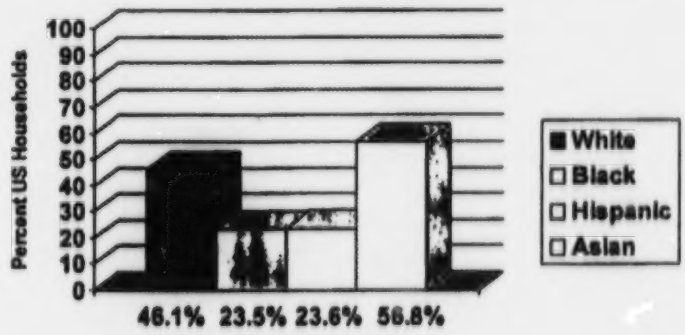
of men and 31.4% of women were using the Internet.[40] The study also revealed that there was a shift by August of 2000, where 44.6% of men and a statistically indistinguishable 44.2% of women were Internet users.[41] In August 2000, Media Metrix and Jupiter Communications released new data on what had been a gender gap concerning use of the Internet. According to the findings, the number of women online exceeded that of men 50.4% as compared to 49.6% and the online population of women is growing faster than the online population overall 34.9% versus 22.4%.[42] As with other segments of our society policymakers must be made aware of the some of the differences that motivate women and men to utilize technology. Only then can an appropriate and successful response be developed.

There have been a small number of studies trying to ascertain why there are differences between men and women when dealing with technology. According to *Tech-Savvy: Educating Girls in the New Computer Age* (2000), a recent study by the American Association of University Women Educational Foundation Commission on Technology, Gender, and Teacher Education, a majority of high school girls are somewhat disinterested in technology education, and fewer women than ever before are entering technology fields.[43] The committee concluded that gender equity means using technology proactively, interpreting the information that technology makes available, understanding design concepts, and that technology must be relevant for nontraditional users and learners. "Girls," the report said, "find programming classes tedious, computer games redundant and violent, and computer careers uninspiring."[44] It is important to recognize that members of our society are simply not interested in technology. In this case, it is society's job not only to provide opportunities to use information technologies, but also to motivate.

Race

The impact of the Digital Divide on race has spawned a number of research projects from different public and private sources. As a result, there have been some discrepancies in the data that makes it more difficult for policy makers to develop a viable response. The NTIA report as shown in Figure 1, indicates that during the year 2000, households of Asian Americans and Pacific Islanders have maintained the greatest Internet penetration at 56.8% while white households continued to have the second highest rate of access at 46.1%.[45] At the other end of the spectrum, Black and Hispanic households continue to experience the lowest Internet penetration rates at 23.5% and 23.6%, respectively.[46] These results prompted a number of nongovernmental sources to study the relationship between race and the Digital Divide.

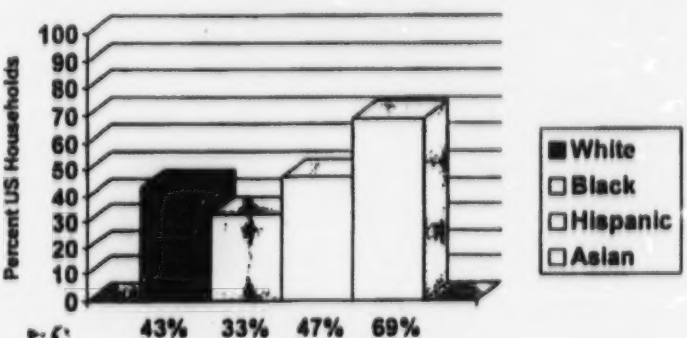
Fig. 1: Percent US Housholds with Internet Access By Race (2000)



Source: US Dept. of Commerce

Forrester Research is an independent Internet research firm, analyzing technology change and its impact on business, consumers and society. A study in April, 2000, conducted by Forrester indicates that the federal government's information on the reasons some Americans do not have access to the Internet are widely divergent. In *The Truth About The Digital Divide*, Forrester drew upon a survey of more than 80,000 households that was fielded in January, 2000.[47] Forrester said that income — not ethnic background — is the determining factor for Internet penetration, followed by age and education.[48] Based on race, the study illustrated in Figure 2 indicates US whites rank third in online access, behind the 69% of Asians who were online as of January, 2000, and the 47% of wired Hispanics.[49] The study further indicates that 43% of whites had access in January, 2000. African-Americans place fourth, however, it should be noted that they are the fastest-growing group of netizens, with their numbers increasing by 44% between 1999 and 2000.[50] But because many are too poor to buy a personal computer, African-Americans also are most likely to access the Internet from outside the home, at public libraries, work or other locations.

Fig. 2: Percent US Housholds with Internet Access By Race (2000)



Source: Forrester Research

It is interesting to note that for each racial segment there are differences in the data presented by the US Department of Commerce and Forrester Research. There is a 3.1% differential for whites, 9.5% differential for African-Americans, a 23.4% differential for Hispanics, and a 12.2% differential for the number of Asians with Internet access. This is not to say that one is more correct than the other or that one of them is methodologically inferior. As is the case with many policy related issues, the point of this comparison is to demonstrate that there are a number of studies from various sources that should be examined before an appropriate response can be fashioned. How can policymakers respond to a problem when there is a lack of agreement between those studies released by the government and those by private firms?

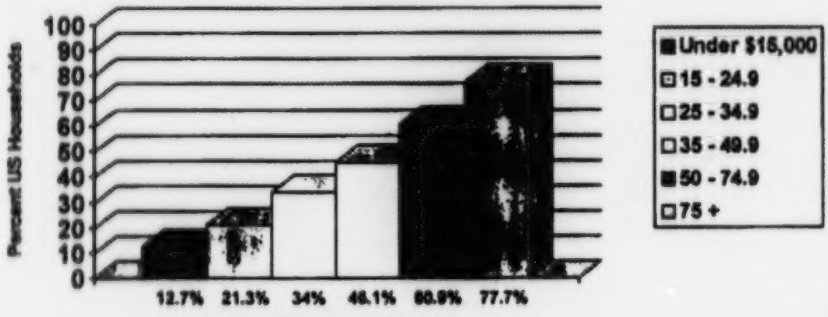
In *Assessing the Digital Divide(s)* Jupiter Communications Inc. gives population projections for Internet use by ethnic group from 1999 through 2005 which seem to support the research performed by Forrester.[51] The report anticipates that the most affluent households, those with earnings over $75,000, will continue to be the largest segment online with 15 million households online by the end of 2000.[52] Moreover, 4.6 million African-American households will be online by the end of 2000 compared with 3.8 million Hispanic households and 2.2 million Asian households.[53] Each of these demographic groups is expected to grow at double-digit rates annually for the next five years. Jupiter forecasts that 64% of African American households will use the Internet in 2005, compared with 30% in 1999; that 68% of Hispanic households will be online in 2005, compared with 33% in 1999; and that 84% of Asian American households will be online in 2005, compared with 65% today.[54] The percentage of whites using the Internet is expected to grow to 76% in 2005.[55] Several surveys were used for the data in the report, including a survey of 30,000 US households that Jupiter conducted. Even if these projections are correct, we should not become complacent in thinking that the Digital Divide will correct itself. As we have seen when innovative technologies are developed, such as broadband, their needs to be a concerted effort made that they be available to everyone. As the Digital Divide closes, there is a continuing need to ensure that a "capacity divide" does not widen, preventing "quality" access such as downloading steaming videos and other high capacity programs and software.

Class

Household Internet access may also correlate closely with income. Across the US, however, households in the lower income bands registered increases in Internet access much faster than the national average according to NTIA. Referring to the following Figure 3, households with less than $15,000 in income had a 12.7% Internet penetration rate.[56] In August, 2000, the penetration rate for households with incomes between $15,000 and $24,000 were at 21.3% while those between $25,000 and $34,999 stood at

34 %.[57] Households with incomes between $35,000 and $49,999 achieved a 46.1% Internet penetration rate in 2000.[58] Households with incomes between $50,000 and $74,999 were at 60.9%, while those at $75,000 and above were at 77.7%.[59] It appears from the graph below, that as income increases the correlation to Internet use also increase.

Fig. 3: Percent US Households with Internet Access By Income (2000)

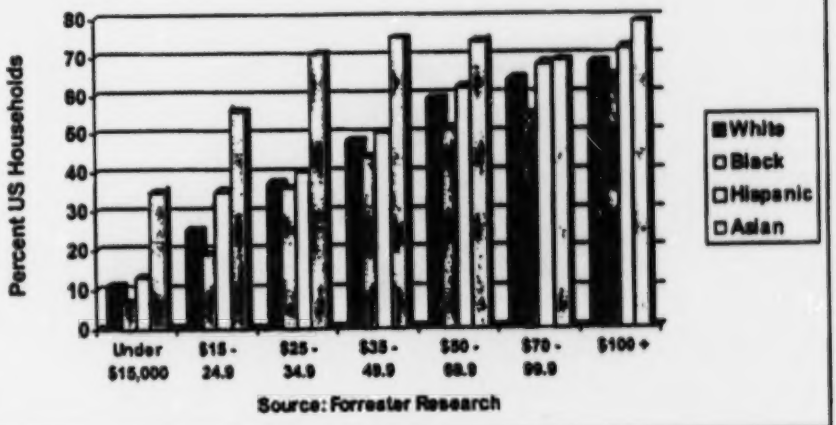


Source: US Dept. of Commerce

The analysis was taken one step further by Forrester Research by examining income along with race. Their results illustrate a stronger correlation toward income than the racial component. As demonstrated by Figure 4 there is a combination of factors that determines consumer likelihood to be online, income being the best predictor across ethnic groups, online penetration rises as income rises. When accounting for race and income, there is a noticeable increase within each of the racial categories as well as a shift in the likelihood of access across racial segments. African Americans who make less than $15,000 have the lowest rate of access at 7%, with whites being the second lowest at 11%.[60] Also in this income bracket, Asian Americans have the greatest rate of access at 35% with Hispanics being a distant second at 13%.[61]

At the mid-level range: $35,000 to $49,999 African Americans are the lowest at 44%, with whites being the second lowest at 48%.[62] Asian Americans have the highest access at 75%, with Hispanics second at 62%.[63] Finally, at the highest income bracket (those earning over $100,000) the trends across racial lines are consistent, with African Americans being the lowest at 65% followed by whites with 68%.[64] Asian Americans again have the best access at 79% and Hispanics are second at 72%.[65] Even though within each income bracket the ratio differential doesn't fluctuate, the data suggests, contrary to previous studies, that whites are not the most likely to have access to the Internet.

Fig. 4: Percent US Households with Internet Access By Income & Race (2000)



Source: Forrester Research

This examination of both government and private data was used to demonstrate that different methodologies, sources of data, and results should be acknowledged in order to better understand and cope with the Digital Divide. These numbers further demonstrate that the Digital Divide is extremely complex and that there are a number of variables at work. Total reliance on one variable whether it is race, education or income cannot fully explain the differences between technology haves and have-nots. Another area that needs to be examined more strongly is technological literacy. Most of the studies available focus on access or usage but fail to consider those individuals who have access but lack the skills necessary to surf and utilize the Internet and other information technologies. It is up to policy makers to sift through the aggregate data in order to respond in the most effective way. It would seem, however, that any effective strategy would have to target multiple causes in order to have the greatest success.

Part IV: Conclusion

The Digital Divide is a complex and enormous concern that needs to be the subject of further study. There are a number of perspectives that have yet to be fully explored, including the international perspective, the divide's impact on Native Americans, and a state by state examination of pilot projects that have been attempted to increase the number of individuals accessing the Internet, as well as the number of individuals who are technologically literate. Policymakers may have a difficult time sifting through all of the available data in order to make informed choices that will provide the best solutions for this problem. The research helps to illustrate that the most viable and successful responses will include assistance from government, nonprofit organizations, schools and the private sector.

The federal government and the states have attempted to narrow the Digital Divide through a number of initiatives. They include setting aside specific business days for volunteerism designed to educate have-nots on information technologies; using a network of civic and nonprofit organizations to secure and donate or provide Internet-related technology to underserved segments of the population; supporting free or low cost services such as cable in the classroom or public libraries; developing databases to facilitate research; sponsoring information-sharing events or seminars, such as the US Digital Divide Summit and Digital Divide Forum, to raise awareness and develop strategies; and increasing diversity in technology companies.

Governments at all levels in the United States promote and support innovative programs to narrow the Digital Divide through policies and programs. For example, the Department of Education awards Technology Literacy Challenge grants to communities to equip classrooms with computers, link schools to the Internet and train teachers in new information technologies. American cities have taken important steps in the national effort to bridge the Digital Divide by making a strong commitment to citizens, technology literacy and access, as well as by instituting key policies. At the international level, the heads of state should use their influence to invite citizens to participate in efforts to narrow the Digital Divide. In order to be successful, we must adapt to the needs of those who are affected by this technological divide and adopt best practices from public and private entities that are able to make headway in building bridges across the Digital Divide. An examination of the questions raised here may suggest approaches to narrowing the Digital Divide.

Defining the Debate

- How will policymakers be able to respond to the Digital Divide when there has been a failure to adequately define key concepts?

- What do we mean when referring to access, the number of households that own a computer, or the number of individuals who have access to a computer whether at home, school or work?
- Does access include only those individuals who are connected to the Internet through a basic dial-up connection or does it include broadband technologies such as DSL or cable?
- How can policymakers effectively address issues of access uniformly, when new technologies are continually being developed and only available to certain segments and geographic areas?
- Should technological literacy be limited to include those individuals who lack the knowledge necessary to surf the Internet or those individuals who lack the basic skills to utilize a computer?

Impact

- With the increased popularity of "cyberbanking," will those individuals who lack access or technological literacy be unable to benefit from those financial services that are offered through online transactions?
- Should the technological have-nots be forced to absorb a disproportionately high sales tax created from e-commerce transactions that are not taxed?
- Should Congress extend the moratorium on the Internet Tax Freedom Act, or will state and local governments be forced to respond by passing some sort of Internet tax to raise lost revenue?
- How can policymakers respond to those segments of society impacted by the Digital Divide, if the statistical research presented is conflicting?

Responding to the Digital Divide

- What level of government is best equipped to handle the complexity of the Digital Divide?
- Is the private sector better equipped to respond to the problems associated with the Digital Divide?
- Would government interaction with private industry and community-based organizations provide a more tailored solution that addresses the unique problems of the Digital Divide?
- What types of services and programs are being provided to combat the Digital Divide and which of those can be used as models for policymakers to guide them toward effective legislation?
- Should government funding be given to public schools and libraries to provide the needed access and technological framework for students and members of the surrounding community?
- How can policymakers respond to the Digital Divide when there is disparity in the data concerning those segments of society that may or may not be affected?

Acknowledgements

The author wishes to acknowledge the comments and support of the following people who assisted in the preparation of this document.

Gregory M. Benson, Jr., NYSFIRM
Rebecca J. Buchner, NYSFIRM
James Feck, NYSFIRM
Robert Freeman, NYS Department of State
David Walsh, NYS Education Departmetn

Footnotes

[1] National Telecommunications and Information Administration (NTIA). *Falling Through the Net: Toward Digital Inclusion*, NTIA Report, Washington, DC: Department of Commerce xv (October 2000) [hereinafter NTIA Report]. Available from: <http://www.ntia.doc.gov/ntiahome/fttn00/contents00.html>.

[2] Communications Act of 1934, ch. 652, 151, 48 Stat. 1064, 1064 (codified as amended at 47 U.S.C. 151 (1994)).

[3] Telecommunications Act of 1996, § 104, 151, 47 U.S.C.A. 151 (West Supp. 1997).

[4] There are a large number of resources available on the Internet concerning the Digital Divide. The Benton Foundation works with other groups such as National Urban League, AOL, and National Endowment for the Arts to help provide solutions for bridging the Digital Divide. Their website is <http://www.benton.org/>. The Digital Divide Network is sponsored by the Benton Foundation and provides links to and information about research, data, resources, and grants available on the topic of access. This information can be found at <http://www.digitaldividenetwork.org/>. Digital Divide PBS is information on public television's two part series on the Digital Divide. Links to various sites concerning the Digital Divide and race, gender, and education are listed. This site also provides links for educators to learn more about the issue and how to implement new strategies in the classroom. This site can be accessed at <http://www.pbs.org/digitaldivide/>. Bridges is an organization of information technology professionals and interested parties working to solve problems of access and the Digital Divide in developing countries: <http://www.bridges.org>. The Digital Divide Project provides resources for teachers and students interested in the Digital Divide. This initiative is sponsored by the University of Washington and the Seattle School District: <http://www.washington.edu/wto/digital>.

[5] *See* NTIA Report, *supra* note 1, at 2.

[6] To find out more about the E-Rate program access <http://www.edlinc.org/erate/>.

[7] U.S. Dept. of Education, National Center for Educational Statistics, Internet Access in U.S. Public Schools and Classrooms: 1994-2000, NCES by Anne Cattagni & Elizabeth Farris (Washington DC: May 2001). The complete report is available online at <http://nces.ed.gov/pubs2001/2001071.pdf>.

[8] *Id.*

[9] To learn more about this initiative see <http://www.nywired.org/community/>.

[10] To view the press release visit <http://www.empire.state.ny.us/press/07-20-01Wired_NiagaraFinal.htm>.

[11] *See* NTIA Report, *supra* note 1, at 23.

[12] *Id.*

[13] Carol Wilson, *Broadband:* Get ready for the Gale, ZDNET News (June 26, 1999). To view the entire article see <http://www.zdnet.com/zdnn/stories/news/0,4586,2281301,00.html>.

[14] *Id.*

[15] David Lake, "The Need for Speed," THE INDUSTRY STANDARD 73 (May 7, 2001).

[16] *Id.*

[17] *Id.*

[18] Michael Pastore, "US Broadband Users Concentrated in Cities," (May 15, 2001). The entire article can be found at <http://cyberatlas.internet.com/markets/broadband/article/0,,10099_766351,00.html>. The original analysis can be found at <http://www.nielsen-netratings.com/>.

[19] *Id.*

[20] *Id.*

[21] *Id.*

[22] *See* NTIA Report, *supra* note 1, at 4.

[23] David Lieberman, "America's Digital Divide: On the Wrong Side of Wires" USA TODAY TECH REPORT (October 1999). For the entire article see <http://www.usatoday.com/life/cyber/tech/ctg382.htm>.

[24] U.S. Gen. Accounting Office, Pub. No. GAO-01-345, *Telecommunications: Characteristics and Choices of Internet Users* (February 2001). The report can be found at <http://www.gao.gov/new.items/d01345.pdf>.

[25] *Id.*

[26] To view the entire survey see <http://nces.ed.gov/naal/design/about92.asp>.

[27] *See* <http://www.en-parent.com/Articles/art-heaton.htm>.

[28] *See* <http://www.ala.org/parents/librariesandinternet.html>.

[29] Patrick McGeehan, *Personal Finance; Banks are Slow to Move Online, But So Are Their Customers*, N.Y. TIMES, June 7, 2000, at H6.

[30] *Quill Corp. v. North Dakota*, 504 U.S. 298, 312 (1992).

[31] Edwin Feulner, "The Internet: A Taxing Problem" THE HERITAGE FOUNDATION NEWS (August 2001). For the entire article see <http://www.heritage.org/views/2001/ejf01-18.html>.

[32] *Id.*

[33] U.S. Gen. Accounting Office, Pub. No. GAO/GGD/OCE-00-165, *Sales Taxes: Electronic Commerce Growth Presents Challenges; Revenue Losses Are Uncertain* (2000).

[34] *See* NTIA Report, *supra* note 1, at 63.

[35] *Id.*

[36] Crista L. Carl & Jay D. Leventhol, "Accessing Online Services With Synthetic Speech America Online, CompuServe, and Online Service Providers," JOURNAL OF VISUAL IMPAIRMENT AND BLINDNESS 92 no. 8 (1998) at 545-551.

[37] Pub. L. No. 101-336, 104 Stat. 327 (1990) (codified at 42 U.S.C. §§ 12101-12113 (1994)).

[38] Pew Internet Project, "Wired Seniors: A Fervent Few Inspired by Family Ties," (Sept. 9, 2001). For the full report see <http://www.pewinternet.org/reports/toc.asp?Report=40>.

[39] *Id.*

[40] *See* NTIA Report, *supra* note 1, at 39.

[41] *Id.*

[42] To view the press release see <http://www.jmm.com/xp/jmm/press/2001/pr_061401.xml>.

[43] American Association of University Women Educational Foundation, "Tech-Savvy: Educating Girls in the New Computer Age" (2000). For a summary of the report see <http://www.edu-cyberpg.com/Teachers/womenAAUW.html>.

[44] The Education World, "Educating Girls in the Tech Age: A Report on Equity," (May 2000). For the entire article see <http://www.education-world.com/a_tech/tech028.shtml>.
[45] *See* NTIA Report, *supra* note 1, at 38.
[46] *Id.*
[47] Ekaterina Walsh, The Truth about the Digital Divide," THE FORRESTER BRIEF (April 11, 2000). The address for Forrester Research is <http://www.forrester.com/>. Paul A. Greenberg, "Study: Digital Divide Not Race-Based," E-COMMERCE TIMES (April 17, 2000).
[48] *Id.*
[49] *Id.*
[50] *Id.*
[51] *See* Sherman Fridman, "Report: Money, Not Race, Underlies Digital Divide," Newbytes (June 19, 2000). To view this article see <http://www.computeruser.com/news/00/06/19/news18.html>. More information from Jupiter Communications, Inc. is available at their Web site located at <http://www.jup.com>.
[52] *Id.*
[53] *Id.*
[54] *Id.*
[55] *Id.*
[56] *See* NTIA Report, *supra* note 1, at 36.
[57] *Id.*
[58] *Id.*
[59] *Id.*
[60] Ekaterina Walsh, The Truth about the Digital Divide," THE FORRESTER BRIEF (April 11, 2000). The address for Forrester Research is <http://www.forrester.com/>. Paul A. Greenberg, "Study: Digital Divide Not Race-Based," E-COMMERCE TIMES (April 17, 2000). Sandy Lawrence Edry, "Bridging the Digital Divide." NEWSWEEK, Weekend Edition (Feb 6-7, 1999).
[61] *Id.*
[62] *Id.*
[63] *Id.*
[64] *Id.*
[65] *Id.*

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